RECEIVED
CENTRAL FAX CENTER
NOV 1 6 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Please amend claims 1, 2, 7, 9, 11, 13, 23-25, and 29-33 and add claims 34-42 as follows:

1. (Currently amended): Method for reducing cross-talk in a communication system comprising a plurality of transmitters for transmitting encoded data signals via respective communications channels to a plurality of receivers and receiving back matrix updating information, said method comprising the steps of:

processing training data signals in a transmitter utilizing an initial pre-coding matrix to produce a first pre-coded training signal;

transmitting said first pre-coded training signal on a first communication channel;

receiving from the first communication channel the matrix updating information computed at a first receiver on the other end of the first communication channel, the matrix updating information having been computed utilizing the transmitted first pre-coded training signal and a second pre-coding matrix located at the first receiver, the second pre-coding matrix responsive to a second pre-coded training signal from at least a second receiver; and

updating said initial pre-coding matrix based on said matrix updating information, whereby said updating tends to offset channel impairments within said first communication channel.

2. (currently amended): The method of claim 1, wherein the matrix updating information is generated in said first receiver based on an impairment indicative signal in response to a determination of a channel impairment level of said first communication channel.

3. (original): The method of claim 2, wherein said impairment indicative signal is determined according to a least mean square (LMS) algorithm.

4. (previously presented): The method of claim 1, wherein signals propagated via each of said communications channels comprise a respective set of in-phase (I) and quadrature (Q) signals forming carrierless amplitude and phase (CAP) modulated signals.

5. (previously presented): The method of claim 1, wherein signals propagated via each of said communications channels comprise a respective set of in-phase (I) and quadrature (Q) signals forming quadrature amplitude modulated (QAM) signals.

6. (previously canceled)

7. (currently amended): Method for reducing cross-talk in a communication system comprising a plurality of transmitters for transmitting encoded data signals via respective communications channels to a plurality of receivers and receiving back matrix updating information, said method comprising the steps of:

processing training data signals in a transmitter utilizing an initial pre-coding matrix to produce a first pre-coded training signal;

transmitting said first pre-coded training signal on a first communication channel;

receiving from the first communication channel the matrix updating information computed at a receiver on the other end of the first communication channel, the matrix updating

information having been computed utilizing the transmitted first pre-coded training signal and a second pre-coding matrix located at the receiver; and

updating said initial pre-coding matrix based on said matrix updating information, whereby said updating tends to offset channel impairments within said first communication channel. ~~The method of claim 1~~, wherein signals propagated via each of said communications channels comprise a respective set of in-phase (I) and quadrature (Q) signals forming carrierless amplitude and phase (CAP) modulated signals. ~~The method of claim 1,~~ wherein said step of updating comprises the steps of:

increasing an amplitude level of at least one respective set of said I and Q signals; and

repeating said steps of processing, transmitting, and receiving until an impairment indicative signal level is less than a threshold level.

8. (previously canceled)

9. (Currently amended): The method of claim ~~1~~7, wherein ~~each of said plurality of~~ the transmitter[[s]] processes training data signals utilizing an initial pre-coding matrix in ~~each~~ the transmitter.

10. (previously canceled)

11. (Currently amended): The method of claim ~~1~~7, wherein:

~~each of said plurality of~~ the transmitter[[s]] performs a step of selecting initial parameters for its respective initial pre-coding matrix prior to transmitting said first pre-coded training signal, said selected initial parameters tending to offset channel impairments of said ~~respective~~ first communication[[s]] channel[[s]].

12. (previously canceled)

13. (Currently amended): The method of claim ~~1~~7, further comprising the step of training an equalizer to reduce channel-specific impairments within said first communication channel.

14-22 (previously canceled)

23. (currently amended): Apparatus for reducing cross-talk in a communications system comprising a plurality of transmitters for transmitting encoded data signals via respective communications channels to a plurality of receivers and receiving back matrix updating information, said apparatus comprising:

~~means for~~ at least one transmitter controller for processing training data signals ~~in a transmitter~~ utilizing an initial pre-coding matrix to produce a first pre-coded training signal;

a near end transmitter ~~means~~ for transmitting said first pre-coded training signal on a first communication channel;

~~means~~ a near end receiver associated with the near end transmitter for receiving from the first communication channel the matrix updating information computed at a first receiver on the other end of the first communication channel, the matrix updating information having been computed utilizing the transmitted first pre-coded training signal and a second pre-coding matrix located at the first receiver, the second pre-coding matrix responsive to a second pre-coded training signal from at least a second receiver; and

~~means for updating~~ wherein said initial pre-coding matrix is updated in said at least one transmitter controller based on said matrix updating information, whereby said updating tends to offset channel impairments within said first communication channel.

24. (currently amended): Method for reducing cross-talk in a communication system comprising a plurality of receivers for receiving encoded data signals via respective communications channels from a plurality of transmitters and transmitting back matrix updating information, said method comprising the steps of:

receiving in a first receiver a first pre-coded training signal from a first communication channel;

processing the first pre-coded training signal in the first receiver utilizing a first pre-coding matrix located in the first receiver to produce the matrix updating information the first pre-coding matrix responsive to a second pre-coded training signal from at least a second receiver; and

transmitting on the first communication channel the matrix updating information computed at the first receiver for utilization by a transmitter on the other end of the first communication channel to update a second pre-coding matrix located in the transmitter based on said matrix updating information.

25. (currently amended): The method of claim 24, further comprising the step of:

generating the matrix updating information in said first receiver based on an impairment indicative signal in response to a determination of a channel impairment level of said first communication channel.

26. (previously presented): The method of claim 25, wherein said impairment indicative signal is determined according to a least mean square (LMS) algorithm.

27. (previously presented): The method of claim 24, wherein signals propagated via each of said communications channels comprise a respective set of in-phase (I) and quadrature (Q) signals forming carrierless amplitude and phase (CAP) modulated signals.

28. (previously presented): The method of claim 24, wherein signals propagated via each of said communications channels comprise a respective set of in-phase (I) and quadrature (Q) signals forming quadrature amplitude modulated (QAM) signals.

29. (currently amended): The method of claim 25, further comprising the step of:

determining the impairment indicative signal in the first receiver using said first pre-coded training signal and a receiver copy of the first pre-coded training signal.

30. (currently amended): Method for reducing cross-talk in a communication system comprising a plurality of receivers for receiving encoded data signals via respective communications channels from a plurality of transmitters and transmitting back matrix updating information, said method comprising the steps of:

receiving in a receiver a first pre-coded training signal from a first communication channel;

processing the first pre-coded training signal in the receiver utilizing a first pre-coding matrix located in the receiver to produce the matrix updating information; and

transmitting on the first communication channel the matrix updating information

computed at the receiver for utilization by a transmitter on the other end of the first communication channel to update a second pre-coding matrix located in the transmitter based on said matrix updating information. ~~The method of claim 24~~, wherein signals propagated via each of said communications channels comprise a respective set of in-phase (I) and quadrature (Q) signals forming carrierless amplitude and phase (CAP) modulated signals, ~~The method of claim 27,~~ wherein said step of updating comprises the steps of:

increasing an amplitude level of at least one respective set of said I and Q signals; and

repeating said steps of receiving, processing, and transmitting until an impairment indicative signal level is less than a threshold level.

31. (Currently amended): The method of claim ~~24~~30, wherein each of said plurality of receivers processes a pre-coded training signal utilizing a first pre-coding matrix in each receiver.

32. (Currently amended): The method of claim ~~24~~30, wherein:

each of said plurality of receivers performs a step of selecting initial parameters for its respective first pre-coding matrix prior to receiving said pre-coded training signal, said selected initial parameters tending to offset channel impairments of said respective communications channels.

33. (Currently amended): The method of claim ~~24~~30, further comprising the step of training an equalizer to reduce channel-specific impairments within said first communication channel.

34. (new): The apparatus of claim 23 wherein the near end transmitter comprises:

an encoder to convert information to be transmitted to an encoded symbol stream; and

a pre-coder to adjust the output of the near end transmitter to offset channel impairments of transmitted signals.

35. (new): The apparatus of claim 34 wherein the pre-coder receives at least one encoded symbol stream from an encoder associated with a different transmitter to adjust the output of the near end transmitter to offset cross-talk impairments of the transmitted signals.

36. (new): The apparatus of claim 34, wherein the first receiver comprises:

a pre-coder to adapt the second pre-coding matrix based on the first and second pre-coded training signals, whereby an initial pre-coder operating parameter set for the near end transmitter pre-coder is determined.

37. (new): The apparatus of claim 23, wherein:

the first receiver selects initial parameters for the second pre-coding matrix in a receiver side training process, said selected initial parameters are propagated back to the near end transmitter for updating the initial pre-coding matrix.

38. (new): Apparatus for reducing cross-talk in a multiple transceiver communication system, comprising;

a controller for processing training data signals using an initial pre-coding matrix to produce a first pre-coded training signal;

a transmitter adapted to transmit the first pre-coded training signal on a first communication channel; and

a receiver adapted to receive, from the first communication channel, matrix updating

information computed at a first transceiver on the first communication channel, the matrix updating information having been computed using the transmitted first pre-coded training signal and a second pre-coding matrix located at the first transceiver, the second pre-coding matrix responsive to a second pre-coded training signal from a second transceiver, the controller updating the initial pre-coding matrix based on the matrix updating information, whereby the updating tends to offset channel impairments within the first communication channel.

39. (new): The apparatus of claim 38 wherein the transmitter comprises:

an encoder to convert information to be transmitted to an encoded symbol stream; and

a pre-coder to adjust the output of the transmitter to offset channel impairments of transmitted signals.

40. (new): The apparatus of claim 39 wherein the pre-coder receives at least one encoded symbol stream from an encoder associated with a different transmitter to adjust the output of the transmitter to offset cross-talk impairments of the transmitted signals.

41. (new): The apparatus of claim 39, wherein the receiver comprises:

a pre-coder to adapt the second pre-coding matrix based on the first and second pre-coded training signals, whereby an initial pre-coder operating parameter set for the transmitter pre-coder is determined.

42. (new): The apparatus of claim 38, wherein:

the receiver selects initial parameters for the second pre-coding matrix in a receiver side training process, said selected initial parameters are propagated back to the transmitter for updating the initial pre-coding matrix.